socionext™
for better quality of experience

Platform SoC

Socionext Inc.

Nomura Shin-Yokohama Bldg.,
2-10-23 Shin-Yokohama,
Kohoku-ku, Yokohama, Kanagawa, 222-0033, Japan
Tel. +81-45-568-1015

http://socionext.com/

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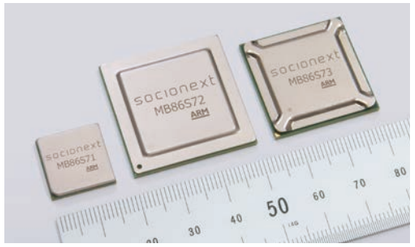
With their high performance CPUs/GPUs and extensibility, our platform SoCs meet the diverse needs of customers

A platform SoC ("PF SoC") is a general-purpose processor serving as the basis of our system development support solutions, which reduce the risks of customers in system development. These risks include developmental delays and cost overruns. Thanks to their high performance CPUs and GPUs, as well as a high level of extensibility, our PF SoCs are capable of meeting a wide variety of needs which cannot be met with existing application processors, thereby solving the problems of customers.

PF SoCs

With their high performance CPUs and GPUs, as well as high-speed interfaces, this product family offers the best products for developing high performance, low power consumption systems at low cost.

We have a product lineup that supports the diverse requirements of office, industrial, medical and other equipment that cannot be met by current application processors. In addition, we have an evaluation board and software that enable quick commencement of system development.



Equipped with High Performance CPUs and Advanced GPUs

With its high performance CPUs and a GPUs that support GPGPU computing, PF SoCs provide a vastly improved software development environment that increases the potential for realizing in software a level of functionality that to date was only possible in hardware.

Advances in software-oriented development will not only increase system development efficiency and improve the inheritability and portability of software resources, but will also accelerate the launching of customer products.

SoCs with Easily Enhanceable Functionality

PF SoCs can also meet requirements related to the enhancement of product functionality through the use of hardware situated outside the SoCs in a product's configuration. The PF SoCs make the development of high-performance systems possible thanks to its high-speed interfaces (including PCI Express) whose generous bandwidth prevent bottlenecks forming in interfaces with custom LSIs outside the SoC.

Development Environment for Increasing Efficiency of Development

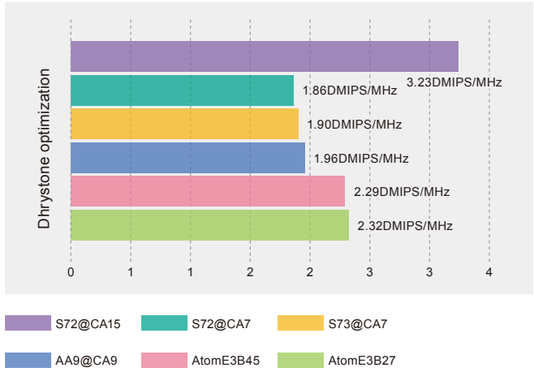
The purpose of our platform software is to increase the cost effectiveness of software development for PF SoC users. In addition to an OS and device drivers, the platform software includes firmware that maximizes the performance of the PF SoCs. What's more, it includes OpenGL ES, OpenCL and other standard libraries supporting OpenAPI, that reduce development periods and enhance asset utilization.

High Performance CPUs

PF SoCs have multiple ARM Cortex-A15* CPU cores, which allow them to operate at high speeds. In addition to the Cortex-A15, PF SoCs also have ARM Cortex-A7 CPU cores, which are compatible with the Cortex-A15 as well as the software used and have low power consumption. By using these CPU cores and configuring the big.LITTLE architecture proposed by ARM, PF SoCs meet two conflicting needs—high processing performance and low-power operation—at a high level.

These CPU cores can also be used independently as AMP (asymmetric multiprocessing) processors.

* EXcluding the MB86S73



Advanced GPUs

In addition to their high performance CPUs, PF SoCs have ARM Mali-T624 GPUs. Using the advanced Mali-T624 GPU, PF SoCs achieve GPGPU computing that improves the performance of overall parallel computing as well as sophisticated graphics processing.

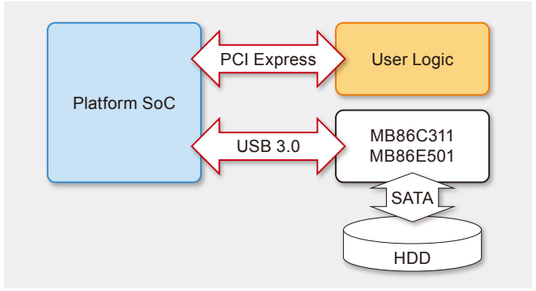
High Extensibility

Function Enhancement with PCI Express

The PF SoC has PCI Express. By connecting user logic and the PF SoC, users can use both the logic that is their unique advantage and a CPUs with high processing performance.

Function Enhancement with USB

As an example of function enhancement with USB, a SATA interface can be enhanced by connecting Socionext's MB86C311/E501 to a PF SoC to enable hard disks (HDD) and other storage devices to be connected to it.



Low Power Consumption

Standby and Response Function

PF SoCs have a standby and response function for enabling power saving on devices with network interfaces. By stopping the supply of power to network devices when they are in an idle state and autonomously responding to access from the network as a proxy, this function reduces the power consumption of the system while maintaining the connection with the network.

In the event that the system receives data requiring a system restart, the function turns on the power to the CPUs to enable quick starting of the system.

DDR Retention Mode

PF SoCs have a function to set memory devices to self-refresh mode, in which the power of the PF SoCs, excluding the minimum required blocks, is shut down (DDR retention mode). This innovative feature allows PF SoCs to stand by with low power consumption that is well below 1 mW and to quickly start up when resuming from standby. This feature contributes to the reduction of system power consumption and resumption time when a system is operated using a battery for the power supply.

Fine Power Domain Control

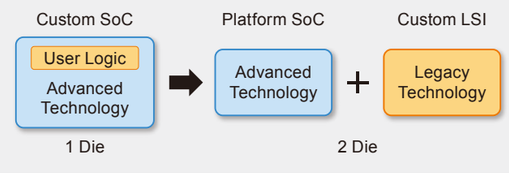
By stopping the power supply to functions of the SoCs that are not in use, system power consumption can be reduced. PF SoCs divide the entire SoC into multiple power domains in order to enable fine power control.

Reducing Risk in Custom SoC Development

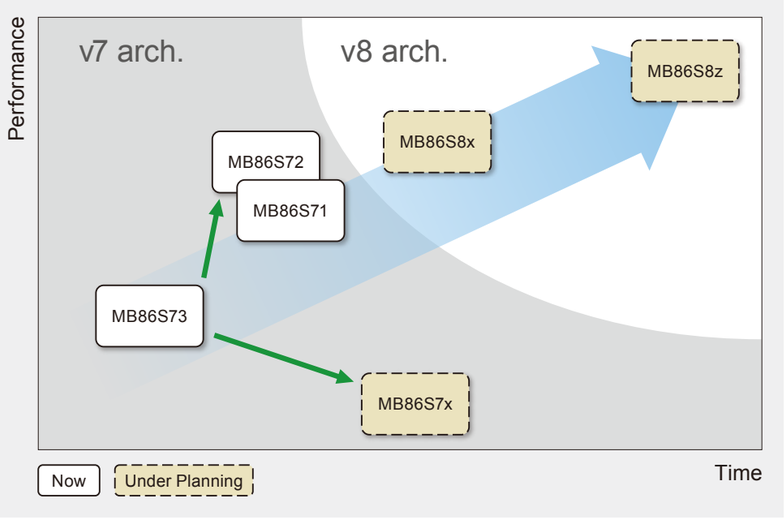
There are largely two types of approaches for realizing user-specific functions with LSI and configuring the system: an approach of developing a totally new SoC with user logic (③) and another approach of developing new LSI with user logic only for the difference with the PF SoC and using them as a chipset (②).

Even when developing a new custom SoC (③), various risks can be reduced by developing it based on the existing PF SoC (①). The components of the PF SoC, including CPU/GPU cores, memory interface block associated with them, media processing block, and high-speed interface block, have been defined previously. Reusing for them when developing a new SoC allows you to significantly reduce the time required for logical design and logical verification. You can start developing software without waiting for the completion of the engineering sample (ES). Meanwhile, using a chipset (②) has the following advantages.

As the development costs will be reduced and the development period will be shorter in such development, it is possible to start evaluating a custom LSI using a board with an ES within three months, at the earliest, from the start of development of the custom LSI.



Product Roadmap



MB86S71

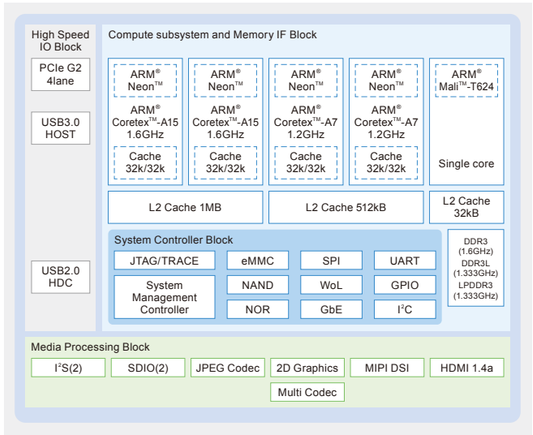
ARM General-purpose Processor for Small and Portable Equipment

The MB86S71 is a high-performance general-purpose ARM processor intended for portable equipment, with excellent power consumption performance.

With its dual ARM Cortex-A15 cores that operate at 1.6 GHz and also dual Cortex-A7 cores with high power consumption performance, the SoC has sufficiently high processing performance.

By using these four CPU cores and configuring the big.LITTLE architecture proposed by ARM, the MB86S71 achieves high processing performance and low-power operation. Also, with its WoL function, LPDDR3, DDR retention mode, fine power domain division, and other features, the SoC supports low system power consumption from various viewpoints. Since this product uses a 16 mm square package while enhancing interface, it is perfect for small embedded devices.

By implementing a framework such as Android or Java as well as the normal platform software provided for PF SoCs by this product, it is also possible to operate a content development environment used for graphics applications requiring response performance, enhancing both the efficiency of system development and the quality of customers.

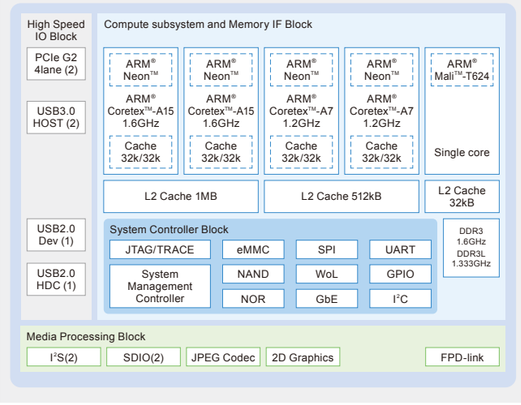


MB86S72

ARM General-purpose Processor Suitable for Developing Systems with High Performance and Low Power Consumption

The MB86S72 was developed as a high-end model of the MB86S73. The SoC has two ARM Cortex-A15 cores and two ARM Cortex-A7 cores. By using these four CPU cores and configuring the big.LITTLE architecture proposed by ARM, the MB86S72 achieves high processing performance and low-power operation. This product uses an ARM Mali-T624 GPU.

In addition to Socionext's unique enhanced Wake on LAN function, the MB86S72 supports a Wake on USB function. With its ability to finely control the power of unused functional blocks and its memory controller capable of continuing to supply power to external SDRAM even when in a sleep state, the MB86S72 supports low system power consumption from various viewpoints.



MB86S73

ARM General-purpose Processor with Well-balanced Processing Performance and Power Saving

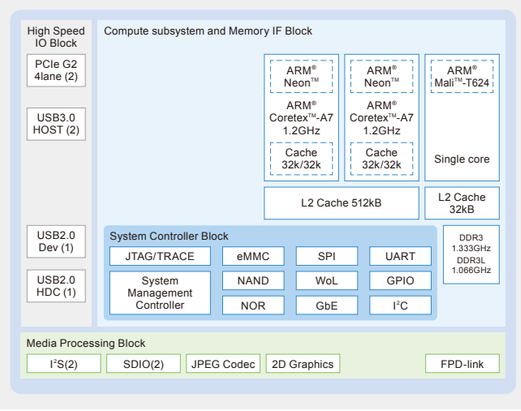
The MB86S73 has two high performance, high power efficient ARM Cortex-A7 CPU cores and can operate at the high speed of 1.2 GHz thanks to its unique and innovative implementation of hardware. Its benchmark, which measures CPU performance, also suggests that the MB86S73 is an extremely power efficient SoC.

The MB86S73 enables power control optimized for all kinds of uses with its subdivided power domain and clock domain. For instance, it supports the retention mode, in which the power of the MB86S73 is shut down when the memory devices are set to self-refresh mode. This feature allows the MB86S73 to stand by with low power consumption that is well below 1mW, contributing to the reduction in system power consumption and resumption time. It also supports DIMM, which makes it easy to select appropriate memory devices for the system.

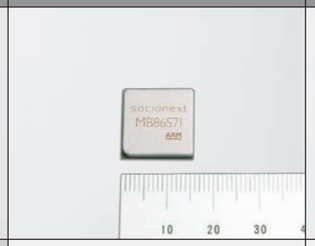
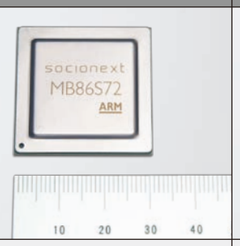
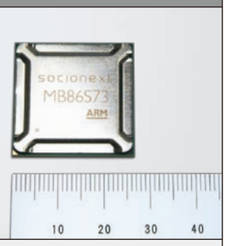
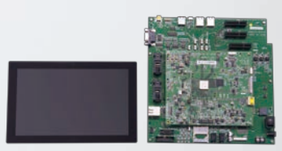
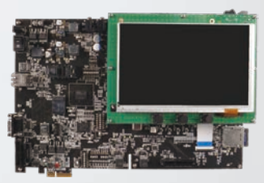
The MB86S73 uses a Mali-T624 GPU. With this advanced GPU, which supports OpenGL ES 3.0, it is possible to realize a highly versatile software platform. The MB86S73 allows use of authoring tools provided by various vendors and realizes a rich GUI even with embedded devices.

For the processing of JPEG images, which are often used, particularly in embedded devices, the MB86S73 reduces the CPU load and power consumption while improving the processing speed with its dedicated CODEC.

The MB86S73 features Socionext's unique standby and response function. In addition to Wake on LAN for devices on a network, automatic response, and Wake on USB functions are also supported. By realizing a part of network processing in hardware, these functions enable a reduction in the CPU load, allowing other tasks to be allocated to the CPU even when network communication is in process.



Product Specifications

Function	MB86S71	MB86S72	MB86S73
Package			
CPU core	Cortex™-A15 2core Up to 1.6GHz 1MB-L2C	Cortex™-A15 2core Up to 1.6GHz 1MB-L2C	—
	Cortex™-A7 2core Up to 1.2GHz 512kB-L2C	Cortex™-A7 2core Up to 1.2GHz 512kB-L2C	Cortex™-A7 2core Up to 1.2GHz 512kB-L2C
3D/GPGPU	Mail™-T624 1core 400MHz 32kB-L2C	Mail™-T624 1core 400MHz 32kB-L2C	Mail™-T624 1core 400MHz 32kB-L2C
MEMC	DDR3 1.6GHz, DDR3L 1.333GHz, LPDDR3 1.333GHz, 64bit/32bit	DDR3 1.6GHz, DDR3L 1.333GHz, 64bit/32bit	DDR3-1.333GHz, DDR3L-1.066GHz, 64bit/32bit
SCB CPU	125MHz	125MHz	125MHz
LAN	GbE, WoL TCP Accelaration	GbE, WoL TCP Accelaration	GbE, WoL TCP Accelaration
FLASH-IF	HSSPI, NOR, eMMC, NAND HSSPI/NOR	HSSPI, NOR, eMMC, NAND HSSPI/NOR	HSSPI, NOR, eMMC, NAND HSSPI/NOR
SERIAL-IF	UART 3ch, GPIO 16ch, I²C 3ch	UART 3ch, GPIO 16ch, I²C 5ch	UART 3ch, GPIO 16ch, I²C 4ch
CODEC	4K-compatible multi-stream video, 32k x 32k JPEG CODEC	32k x 32k JPEG CODEC	32k x 32k JPEG CODEC
Display	HDMI / MIPI DSI	FPD Link (4lane)	FPD Link (4lane)
AUDIO	2ch I²S	2ch I²S	2ch I²S
SD	2ch SDIO	2ch SDIO	1ch SDIO
PCIe	1ch PCIe-Gen2-4lane + Data Scrambler	2ch PCIe-Gen2-4lane + Data Scrambler	2ch PCIe-Gen2-4Lane + Data Scrambler
USB 3.0	1ch Host	2ch Host	2ch Host
USB 2.0	1ch Device	1ch Host, 1ch Host/Device	1ch Host 1ch Host/Device
Development evaluation board			

Development Environment

A development evaluation board is provided for each PF SoC product. Since a Linux BSP is provided for each PF SoC product, customers can commence their development and evaluation immediately.

We provide a semicustom board that can be used to evaluate custom LSIs using user logic by connecting it with an evaluation board for PF SoCs. Approximately 15 million gates of user logic can be written on the FPGA installed on the semicustom board.

Platform Software

Solving challenges in system development, such as an increasing scale and performance improvement, requires enhanced software. For this reason, Socionext provides "platform software" (PF SW).

This software increases the efficiency of software development by maximizing the performance of PF SoC, enhancing the reusability and performance portability of current software assets, and simplifying the introduction of third-party software.

PF SW belongs to the software layer that serves the basic functionality, of all other software layers in embedded devices, and supports the use of the standard Open Framework, including OpenGL and OpenCL, in addition to other software, including the drivers and firmware that control PF SoC and Linux Kernel.

Since common PF SW is provided for all PF SoCs, the compatibility of higher level applications is increased and reusability of current software is enhanced, which is effective in reducing development risks such as the development period and development costs. The same benefits can be also enjoyed with custom SoCs developed based on PF SoC.

Pieces of software related to specific functions, including the processing function related to system control, the security function, and the network standby and response function, are consolidated into the System Controller Firmware (SCFW). Applications control the SoC through this firmware.

PF SoC users can reduce the burden of developing relevant functions by using this firmware which functions together with Linux and shift their resources to application development.

For example, to transition SoC mode to the power saving mode, applications use a general Linux framework. In a lower layer, however, Linux and SCFW operate in close cooperation. This enables state transition without requiring application developers, in particular, to be aware of the SoC power supply or clock control functions.

SCFW also assumes control of resumption from power saving mode. Linux and SCFW share the role of controlling SoC, which enables more robust systems and flexible extension and customization of hardware.

This minimizes the impact on the kernel or BSP when a new custom SoC is developed and makes it possible to quickly obtain the PF SoC and other software that operate the SoC.

In the future we will increase the availability of middleware and expand the scope of support for embedded OSs and other software while aggressively promoting the use of open source software and collaboration with our partners.

In addition, as a method for simplifying the power control of an entire system, we at Socionext will provide a unique solution that will seamlessly manage the power of custom LSIs as well as PF SoCs from an application on Linux.